

Colville Confederated Tribes Chief Joseph Hatchery 2024 APR Production Update

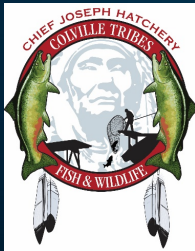
Colville Tribes Fish & Wildlife

Presenters

Matt McDaniel – CJH Manager
Casey Baldwin – Sr. Research Scientist
Andrea Pearl – Sr. Biologist

Contributors

Jim Andrews – Assistant Manager
Tony Cleveland – Acclimation Ponds Lead
Brian Dietz – Sr. Biologist



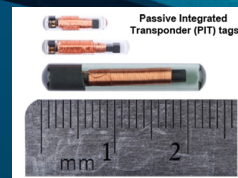
Summer Chinook 2023 Release Summary

| Summer Chinook – Okanogan Stock | | | | | | | |
|---------------------------------|------------|-----------------|-----------------------|--------|------------|----------------|----------------|
| Life History | Brood Year | Release Date(s) | Site | Method | Size (fpp) | # Fish | Target |
| Integrated Yearling | 2021 | 4/17/23 | Omak AP (Okanogan R.) | Forced | 23.0 | 5,348 | 400,000 |
| Integrated Yearling | 2021 | 4/19/23 | Similkameen AP | Forced | 15.5 | 247,267 | 400,000 |
| Segregated Yearling | 2021 | 4/18/23 | CJH (Columbia R.) | Forced | 17.4 | 411,272 | 500,000 |
| SUBTOTAL: | | | | | | 663,887 | 1.3 M |
| Integrated Sub-yearling | 2022 | N/A | Omak AP (Okanogan R.) | N/A | N/A | 0 | 300,000 |
| Segregated Sub-yearling | 2022 | 6/14/23 | CJH (Columbia R.) | Forced | 103 | 115,890 | 400,000 |
| SUBTOTAL: | | | | | | 115,890 | 700,000 |
| GRAND TOTAL: | | | | | | 779,777 | 2.0 M |

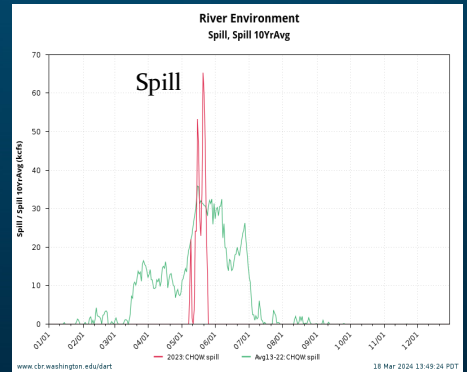
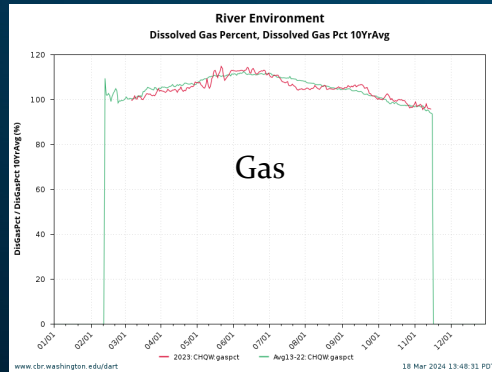
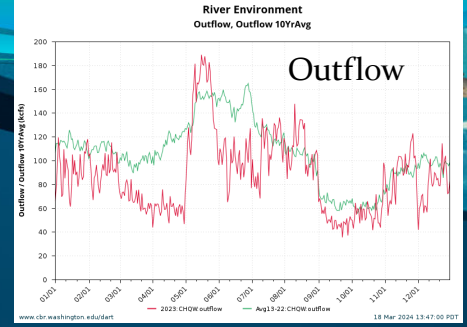
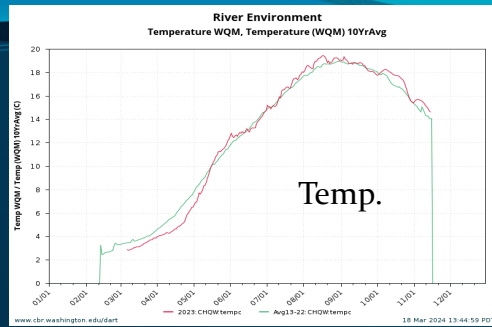
KQM 4: Are the hatchery post-release targets met for survival?



Methods: PIT tag mark-recapture using CJS model on DART

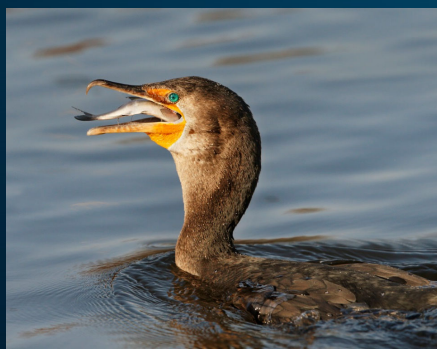


In-river conditions:
CJD Tailrace

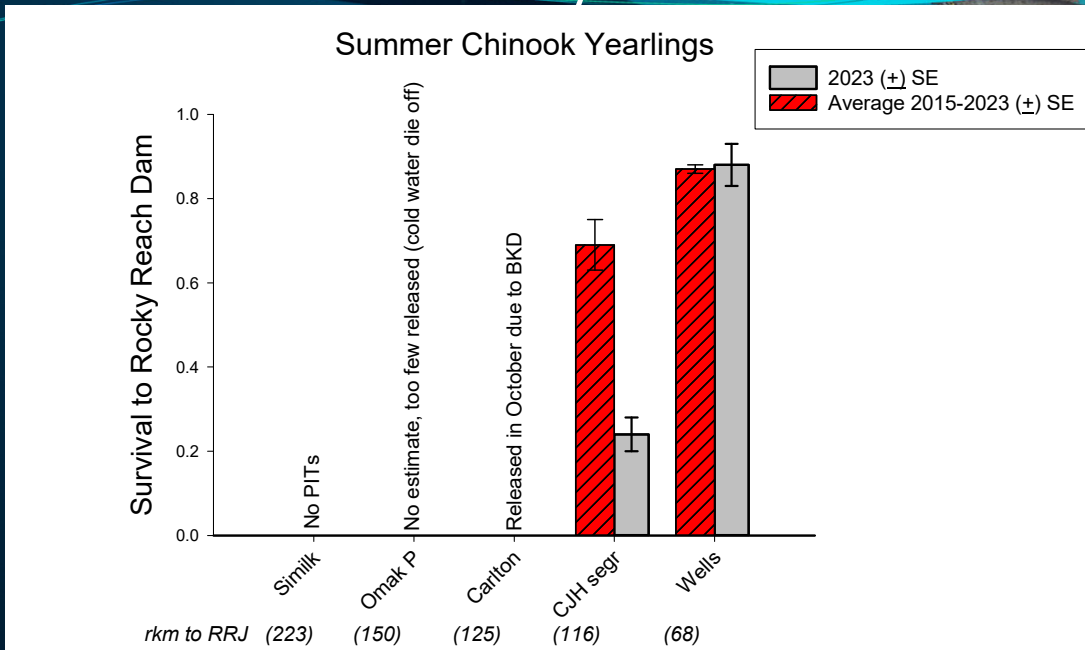


Management Practices

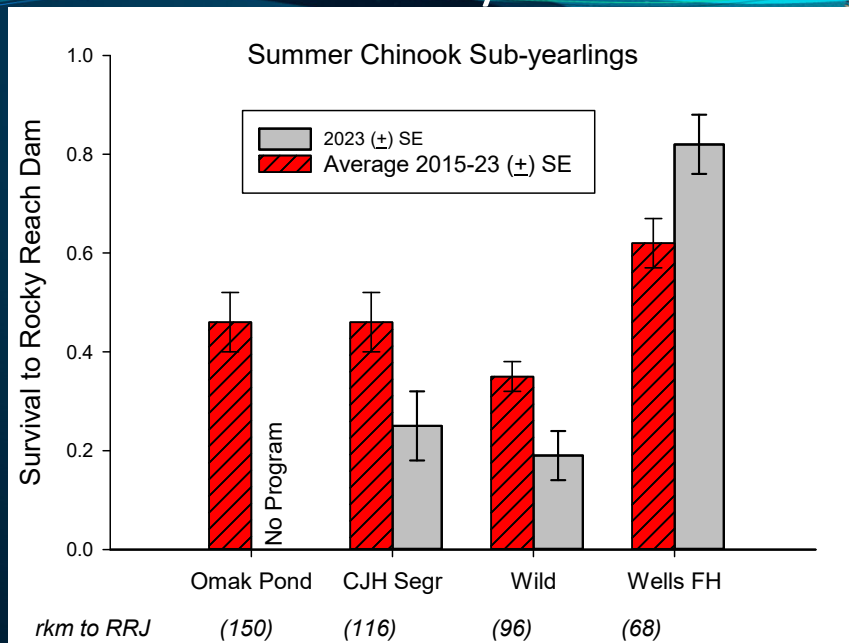
- 2023 night volitional release then 'force out' at CJH to reduce predation (SOP since 2016)
- Fish size and release timing:
 - SumChk Yearlings (CJH) FPP=17.4 (target = 10)
 - Spr Chk Yearlings (CJH) FPP=25.3 (target = 15)
 - SumChk Yearlings (Omak) FPP=23.0 (target = 15)
 - SumChk Subs (CJH) FPP=103.0 (target = 50)
 - 10j @ Riverside...emergency release January 13th
 - CJH Yearlings released April 15-30
 - Subs released June 13-14



Survival to Rocky Reach Dam



Survival to Rocky Reach Dam



Summer Chinook In-river Survival

Summary

- McNary produced inconsistent and odd results again
 - Due to variable spill protocol
- Yearlings to RRJ
 - Segr. program: much lower than avg. (not sure why)
 - Integr. program: NA—cold water event at transfer, high mort.
- Subyearlings to RRJ
 - Segr. Program: much lower than avg.
 - Wild smolts from beach seine: much lower than average
 - Wells FH subs: higher than avg.
 - Something in Wells Pool?

Gonadosomatic Index (GSI) Sampling

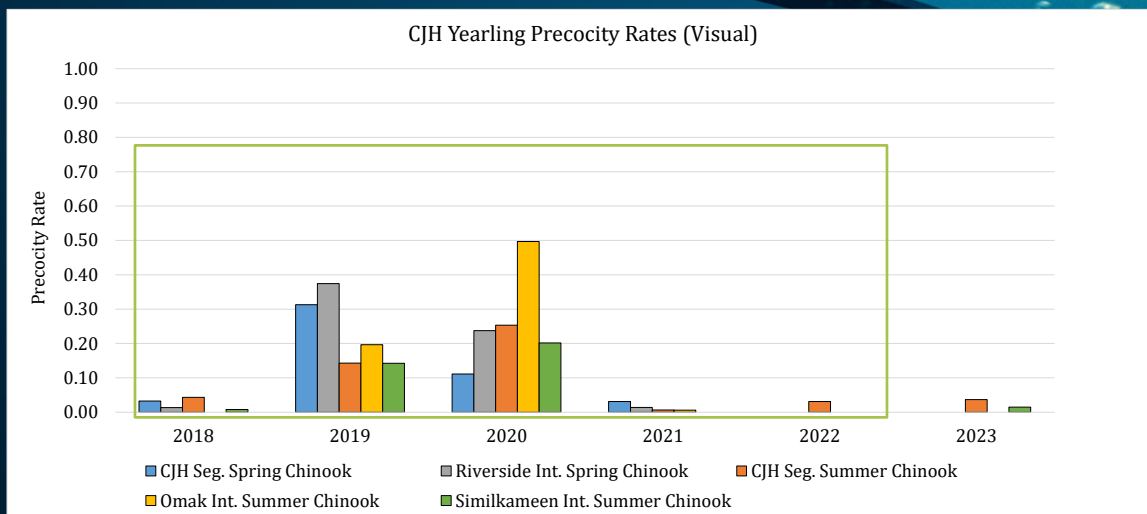
- Yearlings are held for a month after release, sampled in mid-May
- 300 fish from each release group sampled
- Typically 5 total groups from integrated and segregated programs sampled
 - Only 3 of the 5 groups sampled in 2023
 - Segregated spring and Summer Chinook, Similkameen summer Chinook
- Measure weight and length of fish to determine the condition factor
- Identify males vs females based on presence of ovaries vs testes
- Dissect and remove gonads for all males and weigh on a micro scale to calculate the GSI Index



Summary of Results

| Program | 2023 Release Totals | NAD Sample Date | Total Sample Size | No. of Samplers |
|--|-------------------------------|-----------------|-------------------|-----------------|
| Segregated Spring Chinook | 906,909 | 5/15/23 | 301 | 3 |
| Integrated Spring Chinook (10j) | 124,519 (released 1/13/23) | Did not sample | N/A | N/A |
| Segregated Summer Chinook | 411,272 | 5/16/23 | 303 | 3 |
| Integrated Summer Chinook- Omak | 5,348 | Did not sample | N/A | N/A |
| Integrated Summer Chinook- Similkameen | 126,731 | 5/17/23 | 300 | 3 |

Precocity Rates (Visual)



Summary of Results

| Program | 2023 Release Totals | % Males | Maturation % | Mature Males Released |
|--|---------------------|---------|--------------|-----------------------|
| Segregated Spring Chinook | 906,909 | 47% | 0.00% | 0 |
| Integrated Spring Chinook | 124,519 | N/A | N/A | N/A |
| Segregated Summer Chinook | 411,272 | 54% | 3.68% | 15,139 |
| Integrated Summer Chinook- Omak | 5,348 | N/A | N/A | N/A |
| Integrated Summer Chinook- Similkameen | 126,731 | 45% | 1.47% | 1,863 |

BY23 Summer Chinook Broodstock Survival to Spawn

| Integrated (NOR) | | | |
|------------------|----------------|-------------------|---------------------|
| | # Fish Spawned | # Brood Collected | % Survival to Spawn |
| Females | 296 | 333 | 88.9% |
| Males / Jacks | 186 / 11 | 297 / 41 | 58.3% |
| Total | 493 | 671 | 73.5% |
| Segregated (HOR) | | | |
| | # Fish Spawned | # Brood Collected | % Survival to Spawn |
| Females | 247 | 283 | 87.3% |
| Males / Jacks | 171 / 9 | 260 / 28 | 62.5% |
| Total | 427 | 571 | 74.5% |

Bio-criteria standard for survival to spawn: 90%

BY23 Summer Chinook Integrated Egg Take



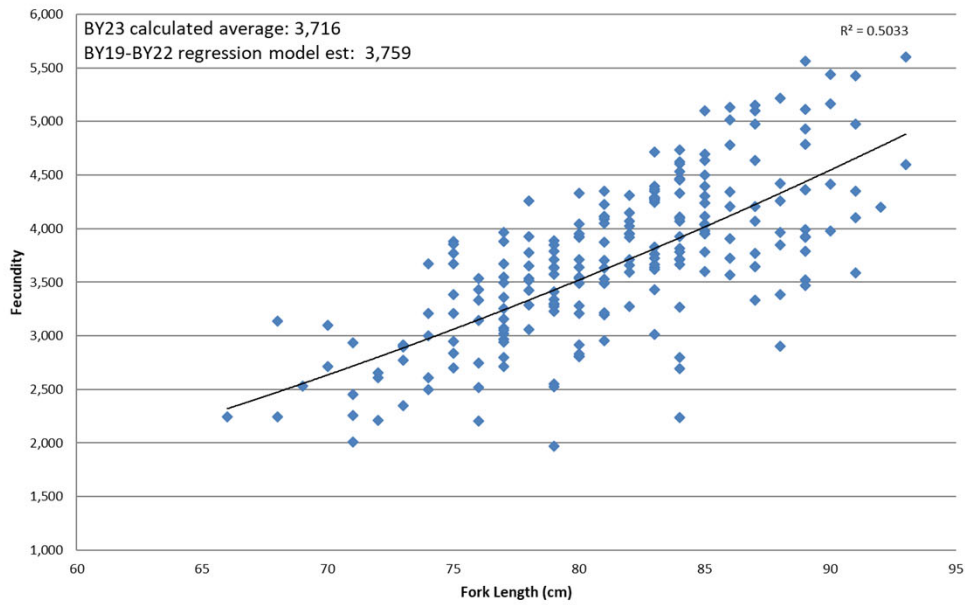
- **Integrated (NOR) Eyed-Egg Take Target: 1,296,405**
 - 856,810 total eyed eggs (66.1% of target)
- **Contributing factors to reduced eyed egg take:**
 - Pre-spawn survival below assumed 90% survival:
 - 73.5% actual (88.9% for females)
 - Fecundity below assumed fecundity of 5,000
 - 3,794 actual
 - Low green to eyed egg survival of 90%:
 - 78.8% actual

BY23 Summer Chinook Segregated Egg Take

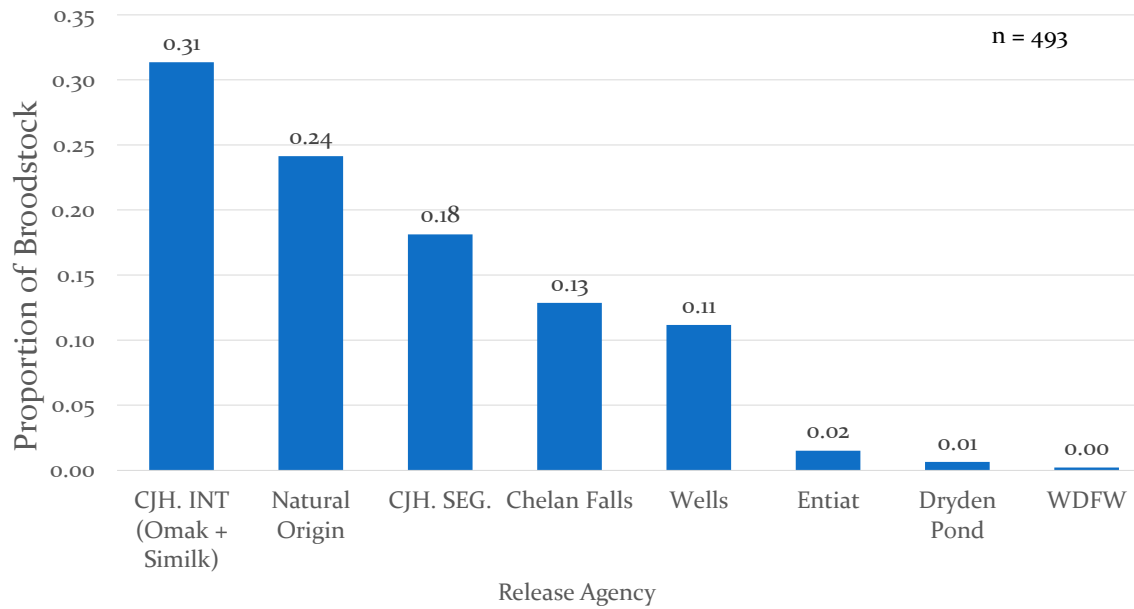


- **Segregated (HOR) Eyed-Egg Take Target: 1,060,200**
 - 763,523 total eyed eggs (72.0% of target)
- **Contributing factors to reduced eyed egg take:**
 - Pre-spawn survival below assumed 90% survival:
 - 74.5% actual (87.3% for females)
 - Fecundity below assumed fecundity of 5,000
 - 3,716 actual
 - Low green to eyed egg survival of 90%:
 - 85.8% actual

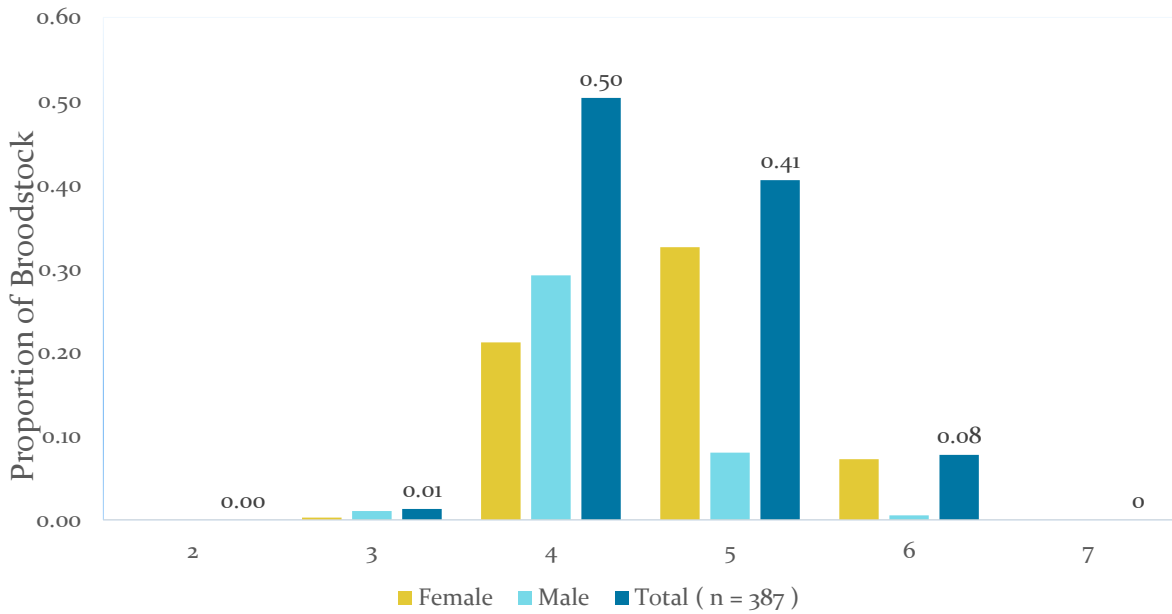
Brood Year 2023 Segregated Summer Broodstock Fork Length/Fecundity Correlation



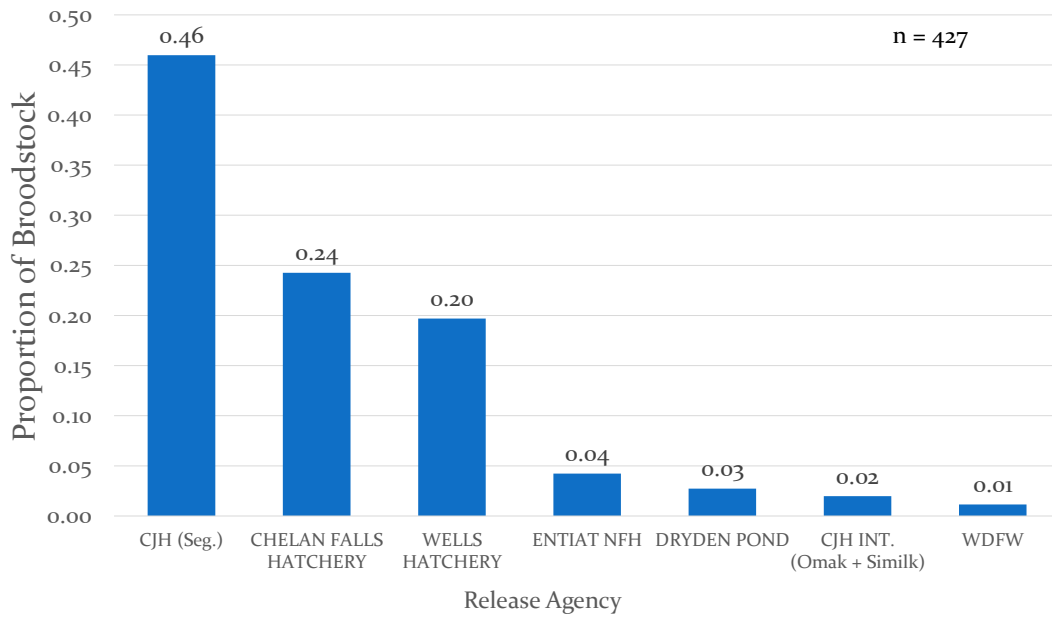
Integrated Summer Chinook Broodstock Composition (By CWT Analysis)

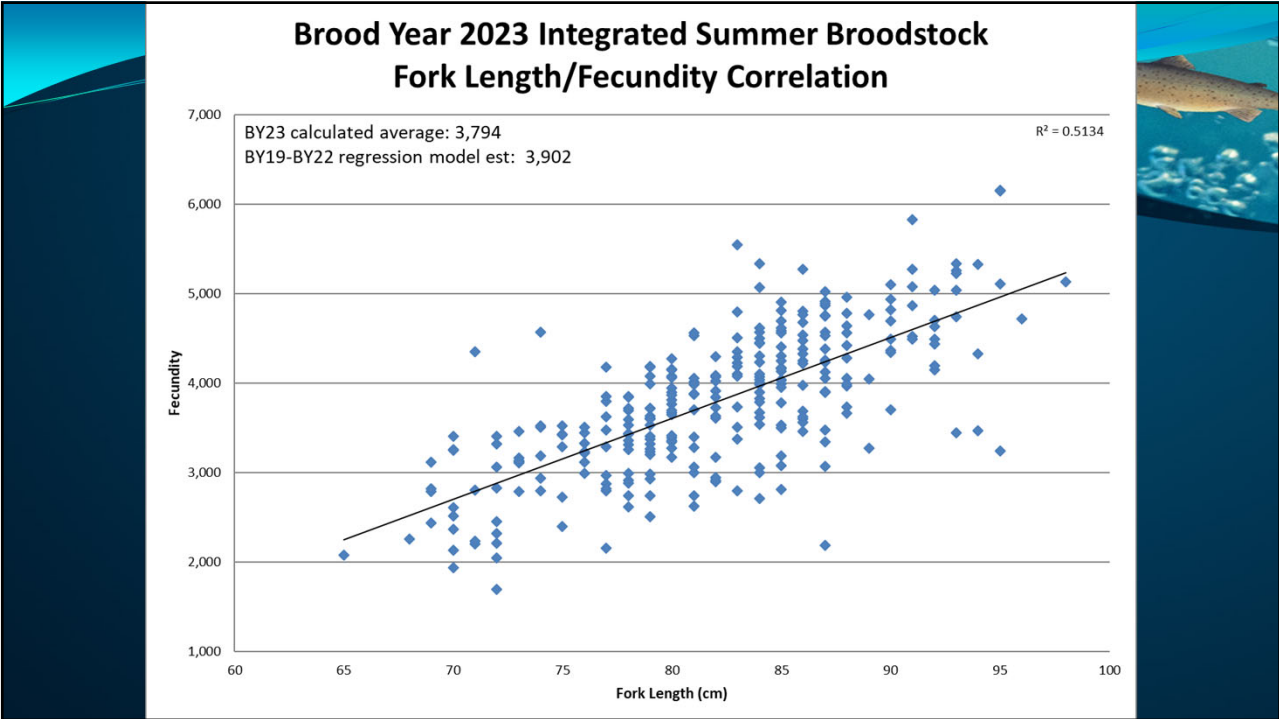
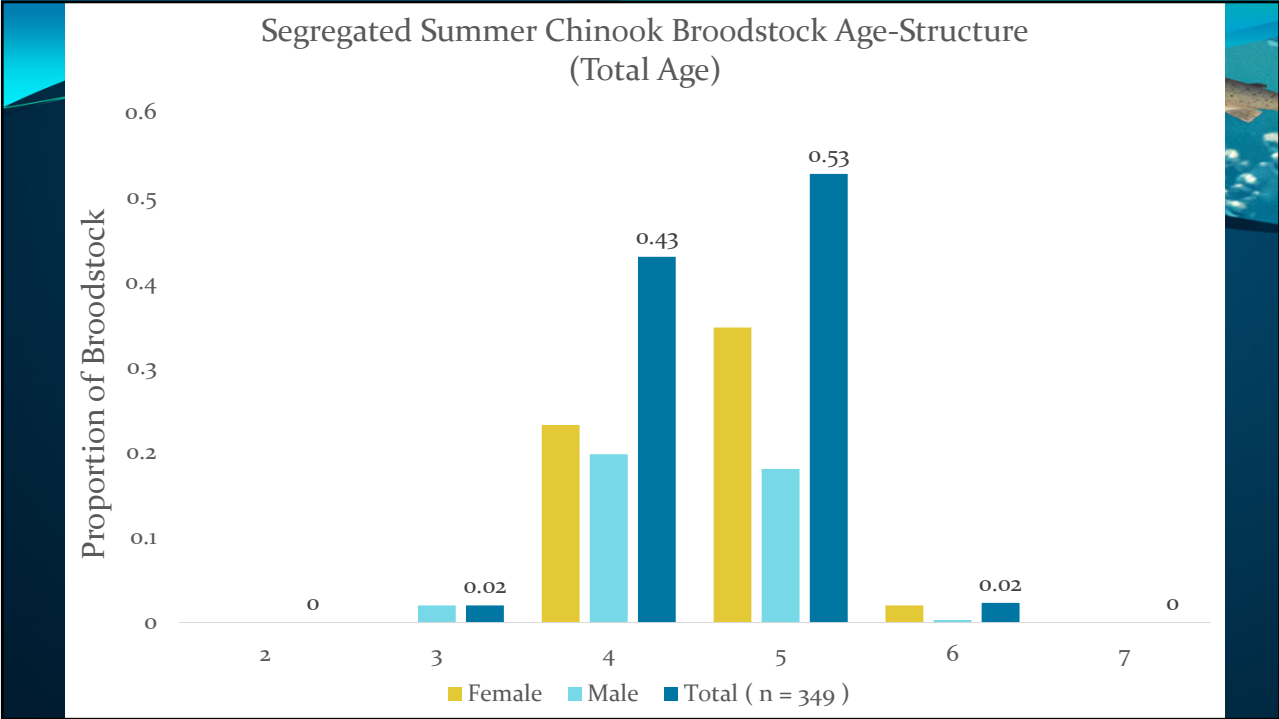


Integrated Summer Chinook Broodstock Age-Structure (Total Age)



Segregated Summer Chinook Broodstock Composition (By CWT Analysis)





Integrated (NOR) Summer Chinook In-Hatchery Performance

| Parameter | Goal | Mean | # Years Targets Met | BY 2023 (26% NOB) | BY 2022 (69.5% NOB) | BY 2021 | BY 2020 | BY 2019 (59% NOB) | BY 2018 (62% NOB) |
|--------------------------------------|---------|--------------------|---------------------------|----------------------|------------------------|------------------|---------|----------------------|----------------------|
| Pre-spawn Survival | 90% | 79.0% | 1/6 | 73.6% | 77.4% | 75.4% | 79.3% | 95.8% | 72.5% |
| Eggs/Female* | 5,000 | 3,980 | 0/6 | 3,794 (3,735) | 4,064 (4,010) | 4,162 (4,061) | 4,012 | 4,096 | 3,745 |
| Percent Eggs Culled | 3% | 0.20% | 6/6 | 0.0% | 0.4% | 0.4% | 0.0% | 0.0% | 0.4% |
| Green-to-Eyed Survival | 90% | 74.2% | 0/6 | 78.8% | 63.4% | 72.1% | 80.4% | 82.9% | 67.7% |
| Eyed Egg-to-Fry Survival | 95% | 76.8% | 0/5 | N/A | 81.1% | 78.9% | 80.7% | 88.8% | 54.4% |
| Egg-to-Smolt Survival – Yearlings | 86% | 58.5% | 0/4 | N/A | 76.5%^ | 36.9% | 77.1% | 81.8% | 38.2% |
| Egg-to-Smolt Survival – Subyearlings | 84% | 77.8% | 1/2 | N/A | N/A | N/A | 65.8% | 89.7% | N/A |
| Releases – Yearlings | 800,000 | 447,852 (56.0%) | 0/4 | N/A | 525,785^ | 252,615 | 594,716 | 708,336 | 235,740 |
| Releases – Sub-yearlings | 300,000 | 51,564 (17.2%) | 0/5 | N/A | 0 | 0 | 88,474 | 169,344 | 0 |

*Beginning with BY21, fecundity includes non-viable eggs, with the smaller number being fecundity excluding those eggs.

^Estimated as of March 12, 2024 and is not included in the Mean.

Segregated (HOR) Summer Chinook In-Hatchery Performance

| Parameter | Goal | Mean | # Years Targets Met | BY 2023 | BY 2022 | BY 2021 | BY 2020 | BY 2019 | BY 2018 |
|--------------------------------------|---------|--------------------|---------------------------|------------------|------------------|------------------|---------|---------|---------|
| Pre-spawn Survival | 90% | 76.3% | 0/6 | 77.1% | 71.8% | 72.2% | 81.2% | 89.7% | 66.0% |
| Eggs/Female* | 5,000 | 3,815 | 0/6 | 3,716 (3,676) | 3,830 (3,797) | 4,053 (3,960) | 3,676 | 4,046 | 3,571 |
| Percent Eggs Culled | 3% | 0.20% | 6/6 | 0.0% | 0.38% | 0.8% | 0.0% | 0.0% | 0.0% |
| Green-to-Eyed Survival | 90% | 74.5% | 0/6 | 85.8% | 73.2% | 74.3% | 81.4% | 87.2% | 56.3% |
| Eyed Egg-to-Fry Survival | 95% | 78.4% | 0/5 | N/A | 72.4% | 73.5% | 86.1% | 90.9% | 69.1% |
| Egg-to-Smolt Survival – Yearlings | 86% | 72.2% | 0/4 | N/A | 92.7%^ | 66.9% | 84.8% | 84.3% | 52.8% |
| Egg-to-Smolt Survival – Subyearlings | 84% | 80.2% | 0/4 | N/A | 92.1% | 78.7% | 80.0% | 81.8% | N/A |
| Releases – Yearlings | 500,000 | 405,883 (81.2%) | 1/4 | N/A | 483,523^ | 411,272 | 453,669 | 568,625 | 189,967 |
| Releases – Sub-yearlings | 400,000 | 194,992 (48.7%) | 0/5 | N/A | 115,890 | 134,706 | 177,932 | 396,433 | 0 |

*Beginning with BY21, fecundity includes non-viable eggs, with the smaller number being fecundity excluding those eggs.

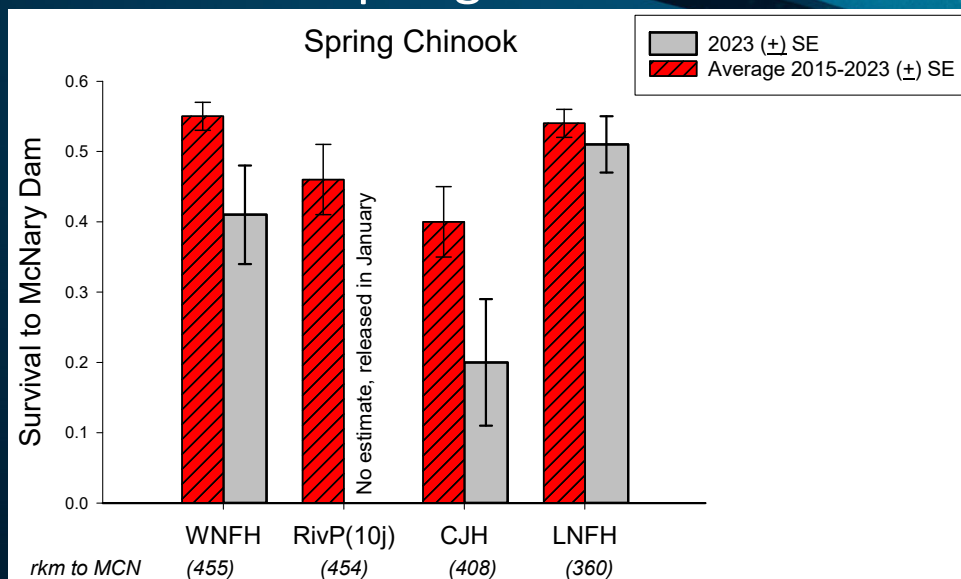
^Estimated as of March 12, 2024 and is not included in the Mean.

Spring Chinook 2023 Release Summary

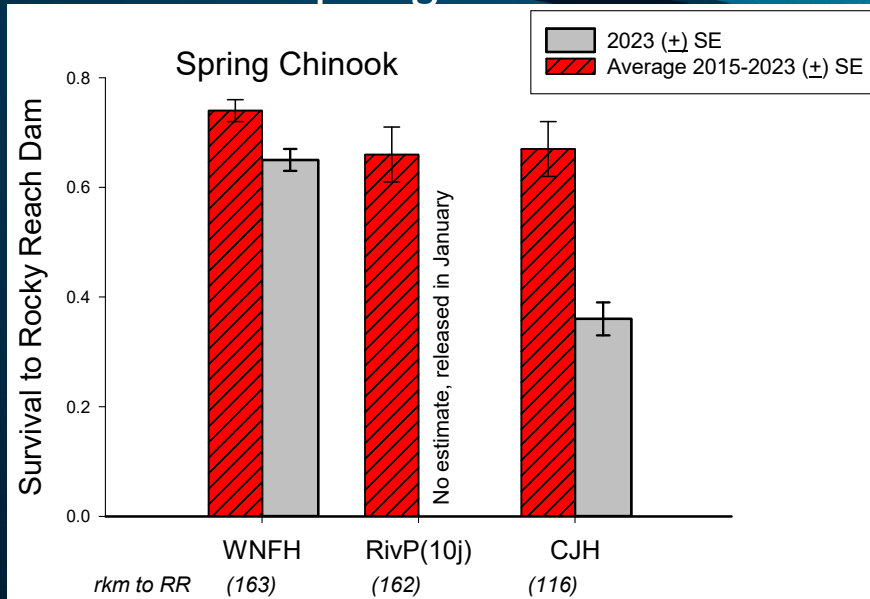
| Spring Chinook | | | | | | | |
|----------------|------------|-----------------|----------------------------|--------|------------|------------------|----------------|
| Stock | Brood Year | Release Date(s) | Site | Method | Size (fpp) | # Fish | Target |
| Leavenworth | 2021 | 4/20/23 | CJH (Columbia R.) | Forced | 25.3 | 906,909 | 700,000 |
| MetComp 10j* | 2021 | 1/13/23 | Riverside AP (Okanogan R.) | Forced | 24.0 | 124,519 | 200,000 |
| TOTAL: | | | | | | 1,031,428 | 900,000 |

*MetComp fish were released in Jan. 2023 due to pump failure at Riverside Pond.

Survival to McNary Dam Spring Chinook



Survival to Rocky Reach Dam Spring Chinook



Spring Chinook Yearling In-river

Survival Summary

- McNary results were noisy but not as bad as past years
 - Due to variable spill protocol
 - Increase in sample size may allow for estimates to BON, which would be better than MCN
- Survival to RRJ was bad for CJH segregated
- RivP / 10(j) released in January (well pump failure)
 - Initial effects look bad
 - We wont know for sure until adults return



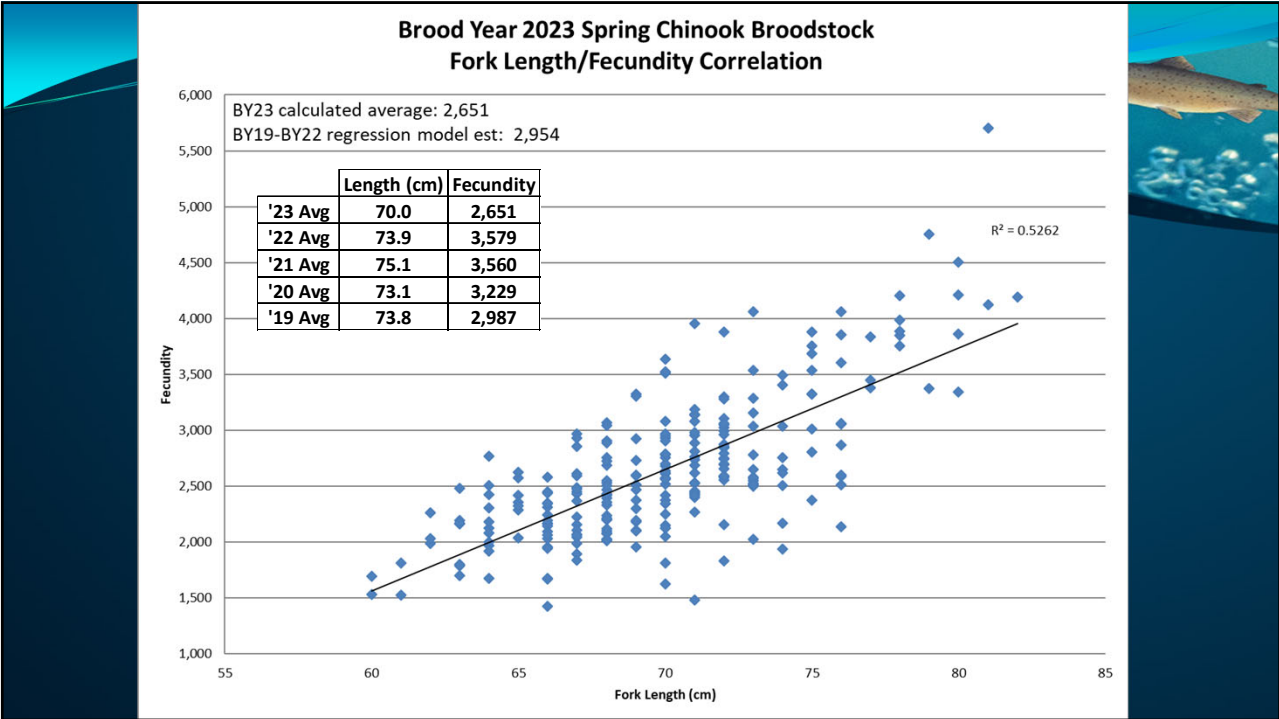
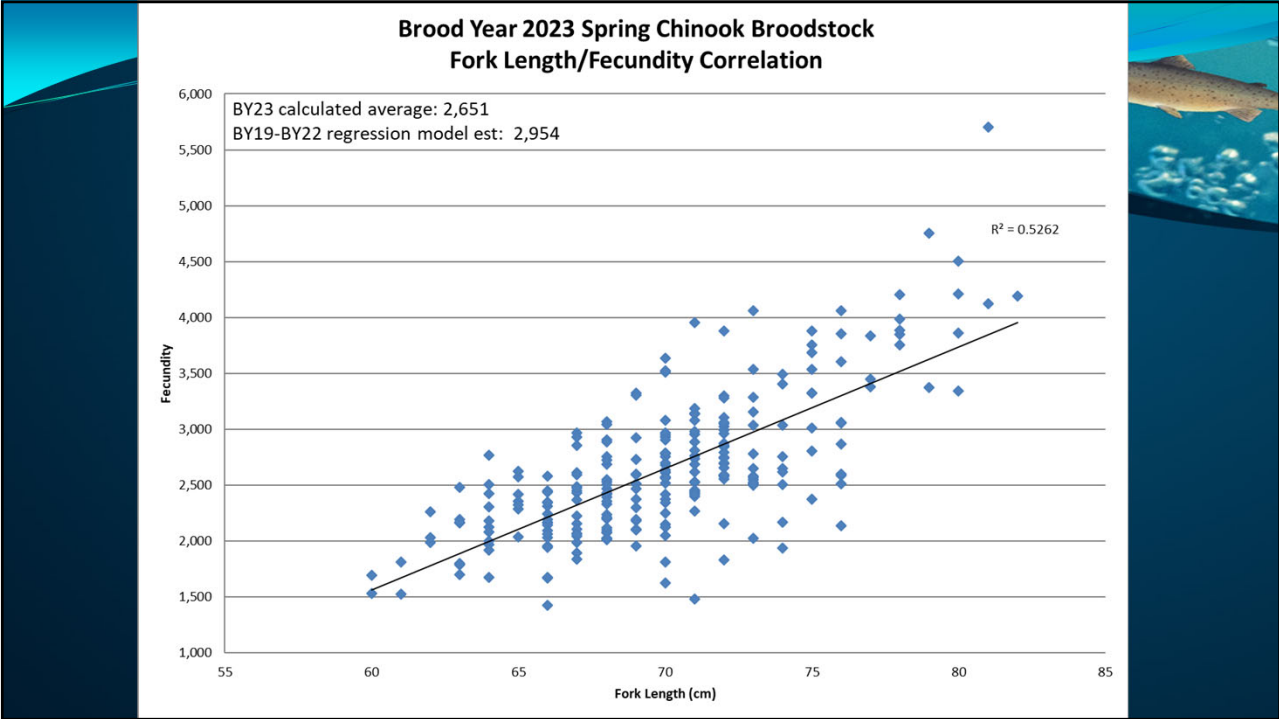
BY23 Spring Chinook Broodstock

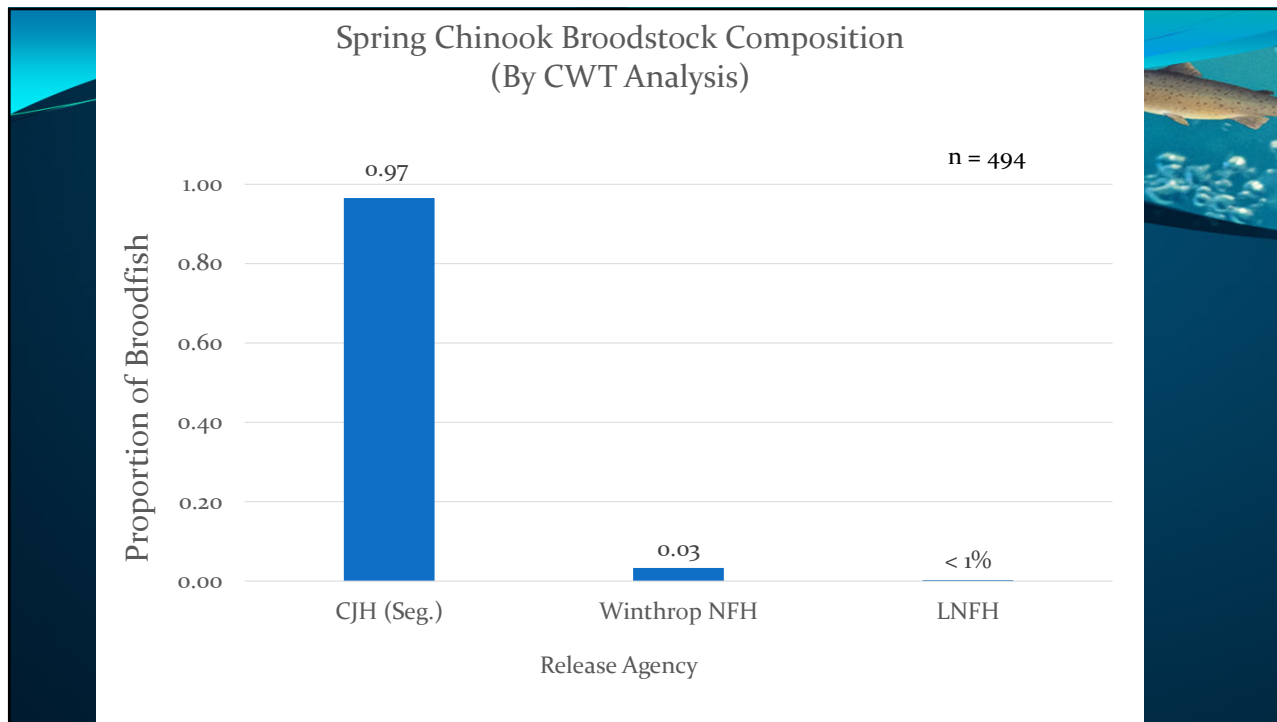
| Spring Chinook – CJH & LNFH Stock | | | |
|-----------------------------------|----------------|-------------------|---------------------|
| | # Fish Spawned | # Brood Collected | % Survival to Spawn |
| Females | 261 | 300 | 87.0% |
| Males / Jacks | 226 / 7 | 261 / 7 | 86.9% |
| Total | 494 | 568 | 87.0% |

Bio-criteria standard for survival to spawn: 90%

BY23 HOR Spring Chinook Egg Take

- **Eyed-Egg Take Target: 787,968**
 - 591,138 CJH eyed eggs (75% of target)
- **Contributing factors to reduced eyed egg take:**
 - Pre-spawn survival below assumed 90% survival:
 - 87.0% actual
 - Fecundity way below assumed fecundity of 3,800
 - 2,651 actual
 - Less brood taken, less females spawned
 - Assumed previous pre-spawn survival and fecundity would continue into brood year 2023, both were less than expected.





HOR Spring Chinook In-Hatchery Performance

| Parameter | Goal | Mean | # Years Targets Met | BY 2023 – CJH stock | BY 2022 – CJH & LNFH stock | BY 2021 – CJH & LNFH stock | BY 2020 – CJH stock | BY 2019 – CJH stock | BY 2018 – CJH stock |
|--------------------------|---------|-----------------|---------------------|---------------------|----------------------------|----------------------------|---------------------|---------------------|---------------------|
| Pre-spawn Survival | 90% | 77.6% | 1/6 | 87.1% | 81.2% | 89.0% | 97.2% | 78.3% | 32.8% |
| Eggs/Female* | 3,800 | 3,153 | 0/6 | 2,651 (2,607) | 3,579 (3,492) | 3,471 (3,451) | 3,218 | 2,987 | 3,014 |
| Percent Eggs culled | 20% | 0.3% | 6/6 | 0.0% | 0.54% | 0.58% | 0.36% | 0.38% | 0.01% |
| Green-to-Eyed Survival | 90% | 90.4% | 4/6 | 90.0% | 92.1% | 89.6% | 87.2% | 93.1% | 90.6% |
| Eyed Egg-to-Fry Survival | 95% | 81.5% | 2/5 | N/A | 99.0% | 98.9% | 92.8% | 98.6% | 20.2% |
| Egg-to-Smolt Survival | 84% | 63.1% | 2/4 | N/A | 98.4%^ | 96.2% | 88.5% | 89.7% | 11.2% |
| Releases | 700,000 | 654,578 (93.5%) | 2/4 | N/A | 890,042^ | 906,909 | 814,717 | 793,984 | 102,702 |

*Beginning with BY21, fecundity includes non-viable eggs, with the smaller number being fecundity excluding those eggs.
 ^Estimated as of March 12, 2024 and is not included in the Mean.

MetComp 10j Spring Chinook In-Hatchery Performance

| Parameter | Goal | Mean | # Years Targets Met | BY 2022 | BY 2021* | BY 2020 | BY 2019 | BY 2018 | BY 2017 |
|--------------------------|---------|--------------------|---------------------------|----------|----------|---------|---------|---------|---------|
| Eyed Egg-to-Fry Survival | 95% | 83.3% | 4/6 | 92.2% | 96.8% | 97.0% | 99.9% | 14.9% | 99.0% |
| Egg-to-Smolt Survival | 84% | 68.9% | 3/5 | 90.0%^ | 56.1% | 94.4% | 90.9% | 7.9% | 95.3% |
| Releases | 200,000 | 163,748 (81.9%) | 3/5 | 213,079^ | 138,355 | 229,978 | 222,508 | 17,315 | 210,582 |

*BY21 Yearlings were released in Jan. 2023 due to pump failure at the Riverside Pond
^As of March 12, 2024 and is not included in the Mean.

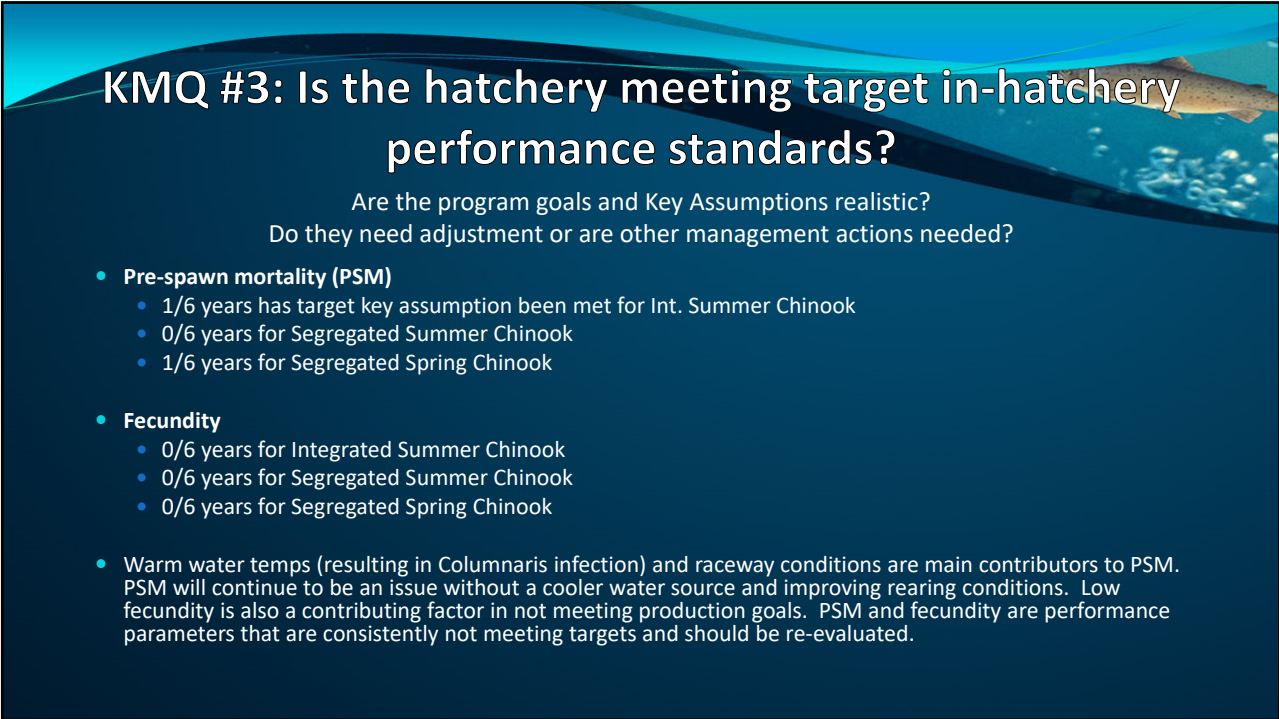
Key Challenges to Date

- **Broodstock Health**
 - Columnaris, more so in summer chinook
 - Deteriorating condition of brood with every spawn
 - Capacity maxed out
 - Raceway conditions – will be coated by May 15!
- **Fecundity**
 - Lower than expected fecundity contributes to low egg take.
- **Green to eyed egg survival**
 - Deteriorating brood conditions contributes to lower quality gametes, leading to low green to eyed egg survival.



KMQ #3: Is the hatchery meeting target in-hatchery performance standards?

Are the program goals and Key Assumptions realistic?
Do they need adjustment?



KMQ #3: Is the hatchery meeting target in-hatchery performance standards?

Are the program goals and Key Assumptions realistic?
Do they need adjustment or are other management actions needed?

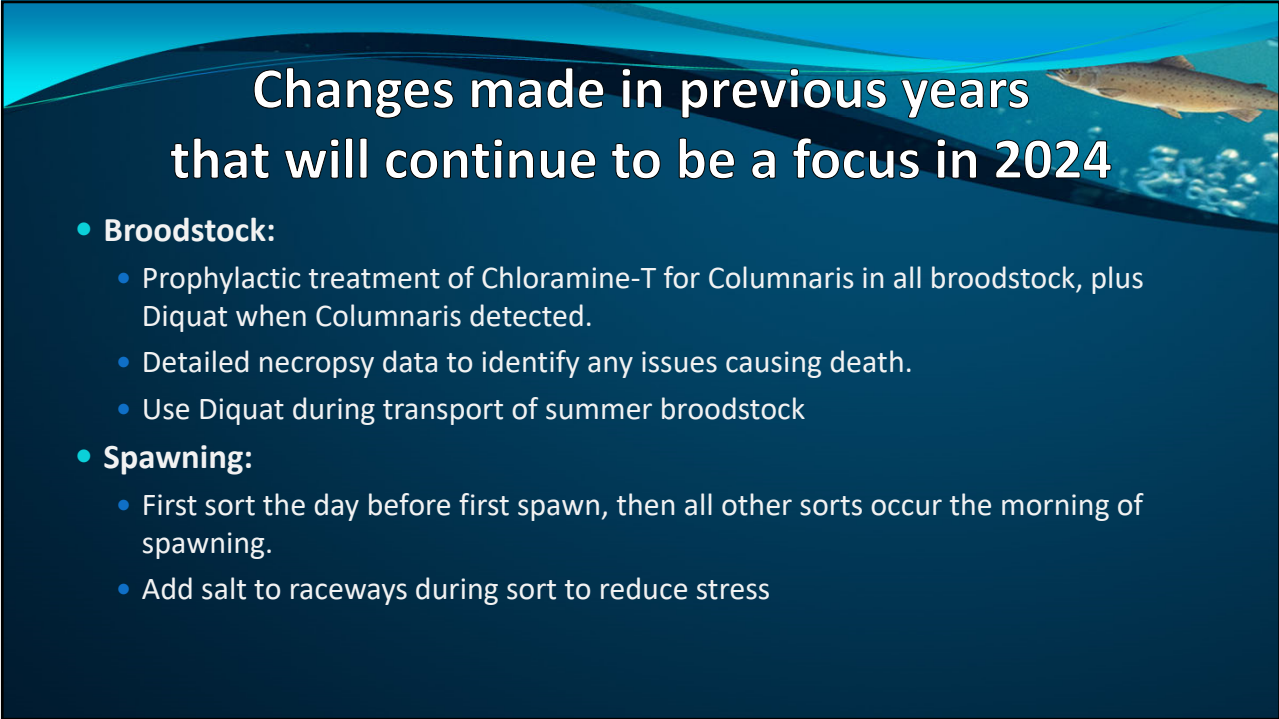
- **Pre-spawn mortality (PSM)**
 - 1/6 years has target key assumption been met for Int. Summer Chinook
 - 0/6 years for Segregated Summer Chinook
 - 1/6 years for Segregated Spring Chinook
- **Fecundity**
 - 0/6 years for Integrated Summer Chinook
 - 0/6 years for Segregated Summer Chinook
 - 0/6 years for Segregated Spring Chinook
- Warm water temps (resulting in Columnaris infection) and raceway conditions are main contributors to PSM. PSM will continue to be an issue without a cooler water source and improving rearing conditions. Low fecundity is also a contributing factor in not meeting production goals. PSM and fecundity are performance parameters that are consistently not meeting targets and should be re-evaluated.

Summer Chinook 2024 Projected Releases

| Summer Chinook – Okanogan Stock | | | | | | | |
|---------------------------------|------------|------------------------|-----------------------|--------|-----------------|------------------|----------------|
| Life History | Brood Year | Projected Release Date | Site | Method | Est. Size (fpp) | # Fish | Target |
| Integrated Yearling | 2022 | 4/15/2024 | Omak AP (Okanogan R.) | Forced | 10.0 | 200,000 | 400,000 |
| Integrated Yearling | 2022 | 4/15/2024 | Similkameen AP | Forced | 10.0 | 315,000 | 400,000 |
| Segregated Yearling | 2022 | 4/15/2024 | CJH (Columbia R.) | Forced | 10.0 | 480,000 | 500,000 |
| SUBTOTAL: | | | | | | 995,000 | 1.3 M |
| Integrated Sub-yearling | 2023 | 6/6/2024 | Omak AP (Okanogan R.) | Forced | 50.0 | 100,000 | 300,000 |
| Segregated Sub-yearling | 2023 | 6/6/2024 | CJH (Columbia R.) | Forced | 50.0 | 220,000 | 400,000 |
| SUBTOTAL: | | | | | | 320,000 | 700,000 |
| GRAND TOTAL: | | | | | | 1,315,000 | 2.0 M |

Spring Chinook 2024 Projected Releases

| Spring Chinook | | | | | | | |
|----------------|------------|------------------------|----------------------------|--------|-----------------|------------------|----------------|
| Stock | Brood Year | Projected Release Date | Site | Method | Est. Size (fpp) | # Fish | Target |
| Leavenworth | 2022 | 4/15/2024 | CJH (Columbia R.) | Forced | 10.0 | 850,000 | 700,000 |
| MetComp 10j | 2022 | 4/15/2024 | Riverside AP (Okanogan R.) | Forced | 23.0 | 210,000 | 200,000 |
| TOTAL: | | | | | | 1,060,000 | 900,000 |



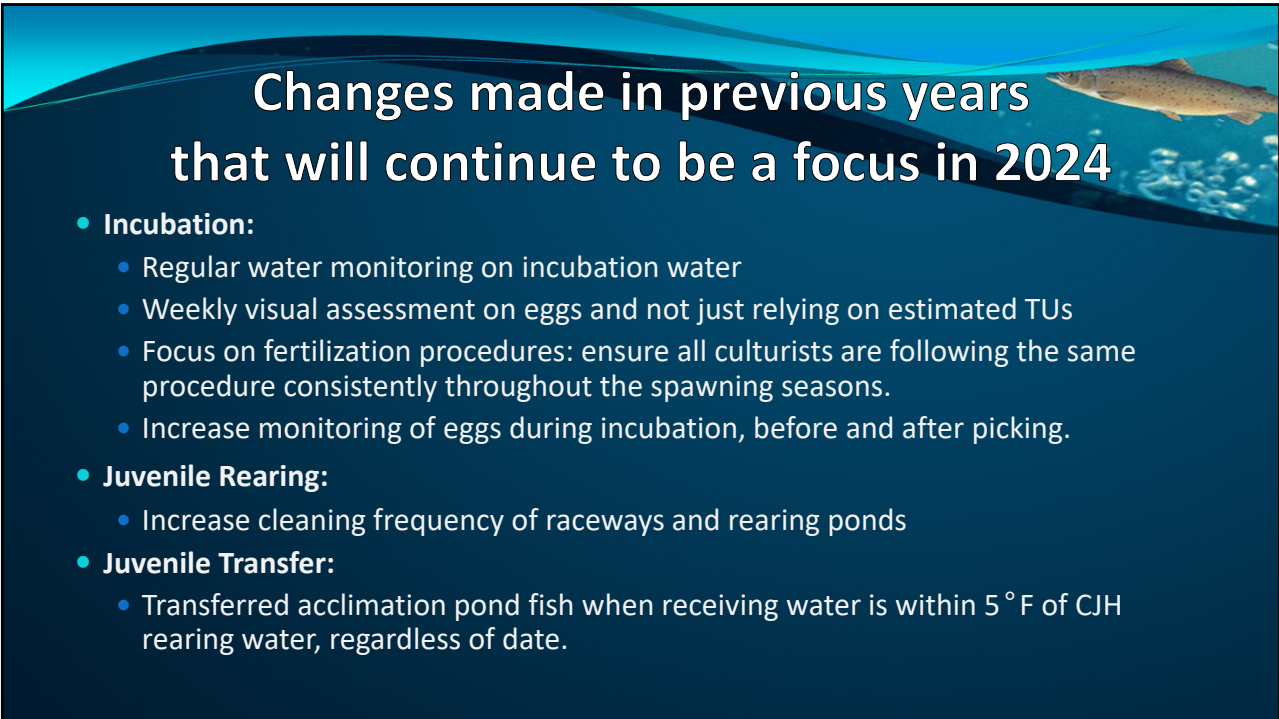
Changes made in previous years that will continue to be a focus in 2024

- **Broodstock:**

- Prophylactic treatment of Chloramine-T for Columnaris in all broodstock, plus Diquat when Columnaris detected.
- Detailed necropsy data to identify any issues causing death.
- Use Diquat during transport of summer broodstock

- **Spawning:**

- First sort the day before first spawn, then all other sorts occur the morning of spawning.
- Add salt to raceways during sort to reduce stress



Changes made in previous years that will continue to be a focus in 2024

- **Incubation:**

- Regular water monitoring on incubation water
- Weekly visual assessment on eggs and not just relying on estimated TUs
- Focus on fertilization procedures: ensure all culturists are following the same procedure consistently throughout the spawning seasons.
- Increase monitoring of eggs during incubation, before and after picking.

- **Juvenile Rearing:**

- Increase cleaning frequency of raceways and rearing ponds

- **Juvenile Transfer:**

- Transferred acclimation pond fish when receiving water is within 5° F of CJH rearing water, regardless of date.

KMQ #3: Is the hatchery meeting target in-hatchery performance standards?

Are the program goals and Key Assumptions realistic?

Do they need adjustment or are other management actions needed?

- **Possible solutions:**

- PSM – The need for a cooler water source is evident to reduce Columnaris events. Coating raceways will help with reducing roughed up brood.
- Fecundity – adjusting fecundity to a more realistic level should be seriously considered for future brood years. However, lowering fecundity while keeping the program goals the same increases broodstock needs.
- Juvenile Survival – Constructing a building around the Riverside and Omak Acclimation Ponds will help in post-ponding juvenile survival.
- Production Goals – do production goals need to be reevaluated?



Questions?